Habitat Management Division - Attachment F
September 1991

Restoration Under Title 62.1 of the Code of Virginia

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Introduction

In October 1989 the Virginia Marine Resources Commission adopted a Wetlands Mitigation-Compensation Policy (WMCP) which set forth pertinent definitions and policy as well as criteria and guidelines for policy implementation. The appropriateness of compensation, as set forth in these guidelines, is dependent on an evaluation of the necessity of the proposed wetlands loss. Necessity, in this case, has been qualified to ensure that all reasonable mitigative actions are taken; that the project is clearly water-dependent; and that there is demonstrated need and an overwhelming public and private benefit. Compensation is hereby defined to mean actions taken which have the effect of substituting some form of wetland resource for those lost or significantly disturbed due to a permitted development activity; generally habitat creation **or restoration** (WMCP 1989). The use here of the term restoration applies to wetlands which were previously altered and are now being returned to a functional status through the permit process.

On July 1, 1990, the State of Virginia adopted amendments to Title 62.1 of the Code. The portion of these amendments contained in 62.1-13.16:1C affect the regulation of subaqueous lands, tidal wetlands and coastal primary sand dunes by granting authority for the issuance of restoration orders to recover lost resources or to prevent further damage to resources. Restoration in this sense is an enforcement action designed to return an area to pre-existing conditions. Since this is generally not permit action, restoration fails to qualify under the existing WMCP as compensation.

The problems we have had and continue to experience with unpermitted development activities have resulted in these Code changes. They were designed to strengthen our existing programs. Existing compensation policy recommends against compensation for small losses (less than 1,000 square feet) in favor of eliminating the loss altogether. Where, when and how do we decide to restore degraded habitat? A determination of the appropriateness of restoration is an implicit function of the restoration hearing, yet little guidance currently exists in Code to assist in an objective evaluation of what is or is not appropriate restoration and how best do we achieve our desired goals.

The purpose of this report is to examine the concept of restoration from an administrative perspective while providing some insight into pertinent technical considerations. This review will, for purposes of discussion, be confined to tidal wetlands with application to companion statutes. Hopefully, this approach will assist in defining a restoration mechanism which meets individual needs and requirements. The WMCP does provide an existing framework to assist in the restoration review process. It may be appropriate at this juncture, however, to try and assess possible policy short-comings relative to restoration while providing a direction for continued investigation.

Wetlands Mitigation-Compensation Policy

The existing compensation policy, which recommends wetlands losses be compensated on a limited basis to replace unavoidable losses, is based on three observations. First, the concept of wetlands compensation contains inherent problems including habitat exchange, technical expertise and evaluation methodology, to name a few, that were yet unresolved in 1989; second, the scientific community does not have all the philosophical and technical answers regarding compensation; and third, the Virginia Wetlands Act, adopted in 1972, intended for the Commonwealth's wetland resources to be preserved in their natural state

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(WMCP 1989). Clearly, the existing compensation policy is designed to limit the practice of compensation in favor of wetlands preservation in the natural state while still accommodating necessary economic development. The problem herein is that restoration, a policy defined form of compensation, is included in State Code to be used as somewhat of a remedial tool for violations of Title 62.1. The Policy limits the practice on one hand while Code promotes it to recover lost resources or prevent further damage to resources.

Despite definition conflicts, the WMCP does provide a two-tiered mechanism for decision structure. On the first tier, an evaluation is made of the necessity for the proposed wetlands loss. Should a project fail this test, it would ostensibly be denied. A project permitted under this scenario would then be subject to the second tier compensation requirements contained in the WMCP Supplemental Guidelines. In general, however, restoration assumes specific habitat loss is unacceptable (the first tier test has failed), yet the WMCP relies on the second tier requirements to adhere to the Supplemental Guidelines to provide some form of quality control.

A simple answer may lie in a subtle revision of policy definitions. Hopefully, such a revision could attempt to bring some order to the terminology applied to the topic of wetlands creation and restoration. Unfortunately, as we see in Virginia, much of the existing nationwide confusion over definitions is becoming formalized in state and local regulations related to wetlands creation and restoration (Lewis 1990). From a scientific viewpoint, wetlands restoration and wetlands creation share a common goal, the establishment of functional wetlands. From an administrative viewpoint, however, the two have distinct differences.

Restoration

Restoration can simply be defined as returning from a disturbed or totally altered condition to a previously existing natural, or partially altered condition through some action of man (Lewis 1990). In general the idea of wetland restoration or creation is a satisfying concept for both regulators and the regulated alike. The repair and replace scenario provides a palatable administrative solution to often complex environmental problems. The reality of the situation, however, reveals that total duplication of natural wetlands is extremely difficult due to the complexity and variation in natural as well as created or restored systems (Kusler and Kentula 1990). Many critical factors including: site constraints, elevation, wave climate, currents, salinity, slope, tidal range, soil chemical and physical properties, sedimentation, timing of construction, and project maintenance (to name just a few) need to be evaluated and possibly incorporated into an overall plan. Yet even in the face of these technical constraints, restoration of a degraded habitat is advantageous and may have a significant chance of success in terms of recreating the full range of wetland functions. This is in part due to favorable site conditions which created the wetland in the first place and remnant wetland components which can be incorporated into the restoration effort.

A significant stumbling block to successful wetlands establishment, however, is a general lack of understanding of wetland ecology and a clear definition of success. Historically, project goals have either been absent or lack sufficient criteria other than the establishment of marsh vegetation over a given period of time. Monitoring and midcourse corrections are generally not provided as a condition of approval and therefore little if any assurance is provided for "successful" establishment. Even when they are required, monitoring and enforcement by officials has in the past been hampered by manpower and budgetary constraints (Race 1985). Success often depends upon the long term ability to manage, protect, and manipulate wetlands and adjacent buffer areas (Kusler and Kentula 1990), yet in a recent survey of Virginia compensation projects, monitoring and follow-up appear to be used on only a limited basis with little consistency (Barnard and Mason 1990).

The problem with restoration is often not whether it is warranted, but rather once so ordered, how does one insure the end results match initial expectations. From a practical standpoint, restoration should be given serious consideration when the extent of the violation is beyond that which would reasonably be approved. Recent actions by local wetland boards have demonstrated the possibility of proceeding directly to the restoration process through a show cause hearing instead of initiating the application review process and backing into restoration through project denial. In this scenario, once a violation has been documented, the board requests the property owner appear before the board to explain the violation. The board then has the option of scheduling restoration or proceeding with a request for application submission and the probable application of civil charges.

Critical Factors

There is unfortunately no single element which can be incorporated into a restoration effort that will guarantee a successful project. There are instead a host of issues which need to be identified and incorporated into a restoration effort, or more appropriately itemized in the project's restoration monitoring plan. This is not to say it is impossible to plan and execute a successful restoration project. It can merely be complex.

What defines a successful restoration project? Success may be viewed as either the replacement of natural functional values or as compliance with a specific contract. It may also be viewed as achieving defined goals (Zedler and Weller 1990). While it is often desirable to promote specific values in a restoration plan, natural functions take time to develop and may be too complex to be detailed in a construction contract (Zedler and Weller 1990). A determination of success then must also include a time element in the form of monitoring plans over a specified duration. Just because an area supports wetland vegetation does not guarantee that the functional values of a wetland are intact. You need only to refer to the "Virginia Wetlands Guidelines" to refresh your memory on the many types of wetlands and associated values and to realize that returning an area to a functional status is more involved than mere grading and seeding. It should be recognized that visual characteristics are generally easier to restore than subtle ecological functions (Kusler and Kentula 1990).

There is no generic blueprint which can be applied to all restoration efforts. While a cookbook approach is desirable, the large number of interdependent and often site-specific variables make this unrealistic. Despite the unknowns, there is enough information available to suggest conditions which favor success. In addition, restoration by it's very nature has a greater chance of success since the area in question has already demonstrated the ability to support a wetland community prior to its conversion.

There is quite possibly an inexhaustible list of criteria to consider when planning a restoration project. The restoration monitoring plan is the vehicle which should be used to set forth all pertinent information for initial review as well as all subsequent performance evaluations. Such a plan should detail all phases of the project. The existing WMCP Section 5 Supplemental Guidelines provide some applicable considerations which can be incorporated into the restoration review process. Of the seventeen points highlighted in the guidelines, the following items have direct application to restoration efforts.

"1. A detailed plan, including a scaled plan view drawing, shall be submitted describing the objectives of the wetland compensation (restoration)*, the type of wetland to be created, the mean tide range at the site, the proposed elevations relative to a tidal datum, the exact location, the areal extent, the method of establishment and the exact time frame from initial work to completion."*

A sample restoration monitoring plan worksheet and sample drawings have been provided (Attachment A) to illustrate one possible format for a restoration plan. These items are not definitive but once documented to the satisfaction of the board, they should become an official component of the restoration order (Attachment B) to be used to gauge project compliance. In general, project drawings should be scaled and include both plan and cross sectional views in sufficient quantity to accurately depict the project area. At a minimum, the following items should be included in project drawings.

- Project Boundaries
- Proposed Elevations
- Proposed Slope
- Hydrology - Source of Water Supply
- Transition Zone - Connection to Upland
- Plant Location and Spacing
- Temporary or Long Term Stabilization Structures
- Location for Disposal of Material to be Excavated
- Defined Benchmarks with Tie-down Measures

"2. Once the grading is completed at the planting site, it should be inspected by a competent authority to insure that the elevations are appropriate for the vegetation to be planted and that the surface drainage is effective."

Elevation plays a crucial role in determining the success or failure of any restoration effort. Final elevations will be influenced by settling and consolidation of substrates (Shisler 1990), as well as possible rebound from fill activities. Ideally, inspections would be preformed by local officials. In the absence of specific expertise, however, a co-

ordinated effort should be made to involve those with appropriate technical training.

"3. The compensation plan **(restoration plan)** *and its implementation should be accomplished by experienced professionals knowledgeable of general and site-specific requirements for wetland establishment and long-term survival."*

This point touches on the consideration of specific competence in restoration design and construction. The issue of competence in this rather technical field calls into question the need for some standardization. Most localities, through a process of trial and error, have adopted their own personalized standards with which area contractors are asked to comply. Unfortunately, even Virginia's more aggressive localities have had to deal with those who simple do not comply with these standards. While the imposition of civil charges will hopefully work to stem this practice, a more straightforward approach and partial solution may result from state certification of shoreline contractors. Restoration places technical demands on contractors requiring expertise in a variety of nontraditional fields.

"4. A performance bond or letter of credit is required and shall remain in force until the new wetland is established; a minimum of two growing seasons."

Section 62.1-13.16:1C provides the Commission or board with the authority to require a reasonable bond or letter of credit in an amount satisfactory to secure compliance. Several localities already utilize these instruments to ensure authorized encroachments are built to permit specifications. The amount of the bond or letter of credit should reflect the costs associated with total restoration from start to finish.

"5. The compensation **(restored)** *marsh should be designed to replace as nearly as possible, the functional values of the lost resource on an equal or greater basis. In general, this means creating a marsh of similar plant structure to that being lost* **(or previously destroyed)**. *This may not be the case where a lesser value marsh is involved, i.e. Group 4 or 5 wetlands. A minimum 1:1 areal exchange is required."*

Of specific concern in any restoration effort is the control of exotic species. In tidewater Virginia, when we speak of exotic we are more often than not speaking of the common reed grass, *Phragmities australis*. While listed as a Type VIII community in the "Wetlands Guidelines", reed grass is an aggressive opportunistic invader with limited habitat value. Often establishing itself in disturbed soils, the plant can quickly spread beyond the limits of restoration, out-competing almost all indigenous plant species. These dense stands of reed grass militate against waterfowl, waterbird, and furbearer populations by replacing desirable food plants and reducing habitat heterogeneity, and open water space (Shisler 1990). The result is a homogeneous stand of vegetation void of the diversity in both plant and animal composition which previously occupied the area. In situations where lesser value wetlands have been compromised and the threat of reed grass invasion is high, it may be advantageous to consider a restoration plan which favors lower elevations in mesohaline areas which in turn may guard against exotic intrusion. In a 1988 study of a compensation site in Norfolk Virginia, investigators concluded that extensive *Phragmites sp.* adjacent to a *Spartina* marsh had not invaded the newly created marsh due to salt intolerance (Blair 1991). When practical, concerted efforts should be made to limit the introduction and spread of this plant.

"6. Not applicable to restoration"

"7. All reasonable steps must be taken to avoid or minimize any adverse environmental effects associated with the compensation **(restoration)** *activities themselves."*

One of the significant considerations which goes into the restoration decision process is that of adjacent habitat destruction or alteration during restoration. Generally small encroachments have at times been allowed to remain for the sake of protecting adjacent habitat from excess siltation and trampling. It should be noted, however, that a restored wetland and adjacent communities have a much greater chance of providing habitat value than one covered with 3 feet of fill. The restoration plan should address probable impacts on adjacent communities and specific efforts designed to mitigate these impacts. Standard erosion and sediment control practices should be employed as well as consideration of the use of turbidity curtains to minimize sediment transport to adjacent subaqueous habitat.

"8. Not applicable to restoration"

"9. Not applicable to restoration"

"10. The type of plant community proposed as compensation (**restoration**) *must have a demonstrated history of successful establishment in order to be acceptable."*

Not all wetland plant species share the same tolerance to change. Also, most wetland plants are adapted for a specific range of conditions which is generally a function of elevation. These considerations must be taken into account when planning a restoration project. While questions regarding the type of plants suitable for a given area can often be answered with field observations in existing adjacent wetlands, the hardiness of the plants is altogether another issue and should be reflected in the maintenance schedule. When the degree of uncertainty is high, the monitoring and maintenance of the site needs to reflect these conditions.

"11. Not applicable to restoration"

"12. Manipulating the plant species composition of an existing marsh community, as a form of compensation (restoration), is unacceptable."

This speaks for itself. It is undesirable to qualify the improvement of an existing marsh as equitable exchange for restoration.

"13. Nonvegetated wetlands should be treated on an equal basis with vegetated wetlands with regard to compensation (**restoration**), *unless site-specific information indicates one is more valuable than the other."*

If one fully considers the complexity, diversity, and abundance of organisms in nonvegetated wetlands, you can then appreciate the need to recognize these resources during the restoration effort. While it may prove difficult and impractical to "plant" the thousands of organisms potentially lost due to illegal fill or dredging, every effort should be made to ensure post-restoration conditions which favor recolonization.

"14. Both short and long term monitoring of the site should be considered on a case-by-case basis. For unproven types of compensation (**restoration**) *the applicant will be responsible for funding such monitoring as is deemed necessary."*

Monies for monitoring can be proffered directly by individual property owners or extracted indirectly through the imposition of civil charges. Sections 62.1-9.1, 62.1-13.18.2:B, and 62.1-13.27:B provide for the imposition of civil charges in addition to the cost of restoration. While maintenance should always be the property owners responsibility, the quality of monitoring would no doubt benefit from objective analysis.

"15. Not applicable to restoration"

"16. Not applicable to restoration"

"17. Not applicable to restoration"

Conclusion

It is clear up to this point that restoration, as a remedy for violations of Title 62.1 has not been used extensively by either local wetland boards or the Marine Resources Commission. It is equally clear that the adoption and application of recent changes in Code will alter this position. The quality of the habitat reclaimed through the restoration process is directly related to an understanding and appreciation of the complexities involved in undoing what has been done and preparing the site to be a self- sustaining persistent feature in the landscape. Restoration is generally not a process to be measured in days or weeks. The reestablishment of specific habitat values may take years. If ever there was an appropriate application of the euphemism "easier said than done," surely this occasion would qualify.

Successful restoration is not a function of good will or the devotion of time and effort. A successful restoration plan is one which recognizes the long term perspective, anticipates that something unplanned may happen and provides for mid-course corrections. It begins with the basic understanding of the critical components of a wetland system and is tailored by site-specific constraints. The restoration monitoring plan and sample drawings contained in Attachment A were designed to assist in the review of these components and the proposed restoration effort.

Ideally, in the years that follow initial habitat conversion, a restored wetland will undergo a regeneration of its functional values. Such a progression could then be quantitatively monitored throughout the term of the plan to provide definitive functional assessments. Unfortunately, extensive quantitative monitoring is both expensive and time consuming. Instead, it may be reasonable to

rely on qualitative evaluation methods especially when considering the history of success in recreating certain wetland types.

Administering restoration efforts goes well beyond the restoration hearing. While maintenance of a project site and reporting requirements can reasonably be delegated to individual property owners, quarterly monitoring during the course of the review period should fall on the regulatory bodies. When problems do arise, the provisions contained in the restoration document need to be upheld by the enforcing body. The restoration project should be designed to be self-sustaining but natural occurrences oftentimes dictate objective intervention to see that project goals are met.

Many of the problems, both philosophical and technical, that were unresolved in 1989 during the formulation of the WMCP remain with us today. In the interim, however, a great deal of effort has been put forth to try and resolve these questions. In light of ongoing changes in the status of the science as well as changes in the laws protecting these resources, the following recommendations are presented to assist in refining the administration of the restoration process.

- As restoration becomes a more widely used management tool, steps should be taken to centrally locate project information. Considering the purview of the VMRC's Habitat Management Division, it is recommended that this body facilitate the consolidation of restoration project information.

- The *Wetlands Mitigation Compensation Policy* needs to be amended and refined to reflect changes in the status of the science as well as changes in State Code. It may be necessary to clarify definitions to reduce policy conflicts and possible ambiguity.

- While a great deal of popular thought exists on how best to evaluate restoration projects, there is a dire need to agree on suitable standard methods to evaluate these types of projects.

- Construction of restoration projects requires technically capable individuals with expertise in nontraditional fields. It is advisable to develop or encourage a certification/training program to help reduce the number of questionable restoration efforts and wasted restoration dollars.

Literature Cited

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Kusler, J.A. and Kentula, M.E. 1990. Wetland creation and restoration, the status of the science. Island Press. pp. xvii-xxv.

Lewis, R.R. 1990. Wetland creation and restoration, the status of the science. Island Press. pp. 417-422.

Race, M.S. 1985. Critique of present wetlands mitigation policies in the United States based on an analysis of past restoration projects in San Francisco Bay. *Environ. Manage.* 9(1):71-82.

Shisler J.K. 1990. Wetland creation and restoration, the status of the science. Island Press. pp. 143-170.

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Zedler J.B. and Weller M.W. 1990. Wetland creation and restoration, the status of the science. Island Press. pp. 405-416.

Attachment A
Restoration - Monitoring Plan

Please answer all questions on the Restoration Monitoring Plan. If a question does not apply to your project, indicate N/A. Please print or type. If additional space is needed, attach extra 8.5" x 11" sheets of paper.

1. Property Owner's Name
   and Complete Address: _____
   _____
   _____

   Phone: Home (A/C) _____ Work (A/C)_____

2. Authorized Agent's Name
   and Complete Address: _____
   _____
   _____

   Phone: Home (A/C) _____ Work (A/C)_____

3. Have you obtained a contractor to preform the restoration? YES NO
   If your answer is "YES", please provide the following information.

   Contractor's Name
   and Complete Address: _____
   _____
   _____

   Phone: Home (A/C) _____ Work (A/C)_____

4. Have you consulted any engineer or other professional knowledgeable in this field to
   assure the design of your restoration project is adequate? YES NO
   If your answer is "YES", please provide the following information.

   Name _____
   Address _____
   _____
   Phone _____

5. How will the violation be removed and where will the fill material be disposed?

_____

_____

_____

6. How will the fill material be contained and stabilized? _____

_____

7. Have you indicated the disposal site on your project drawings? YES NO

8. What is your construction schedule?

	Activity	Time Frame
Phase 1	_____	_____
Phase 2	_____	_____
Phase 3	_____	_____
Phase 4	_____	_____

9. What is the tide range at the site? _____feet

10. State the type and composition percentage of the proposed marsh soil.
(e.g. 70% sand, 25% marsh peat, 5% silt)

_____

11. What is the average proposed slope of the restoration area?
Slope = _____feet (Rise-Vert. Distance) : _____feet (Run-Horiz. Distance)

12. What is the average proposed slope of the upland transition zone?
Slope = _____feet (Rise-Vert. Distance) : _____feet (Run-Horiz. Distance)

13. What is the longest fetch (distance over water) at the project site? _____feet

14. What type(s) of wetland plants will be planted?

_____None (Natural Re-vegetation)

Plant Type	Percentage	Origin
e.g. Spartina alt.	100	Purchased
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

15. For plant material which will be purchased, indicate the supplier's name address and phone number.

Name _____
Address _____
Phone _____

16. If you will be transplanting from existing stands, do you have the requisite permission to harvest plant material? YES NO

17. List the place of origin for each plant type listed in question 14.

Plant Type	Place of Origin
e.g. Spartina alt.	Wilmington, N.C.
_____	_____
_____	_____
_____	_____
_____	_____

18. When will these plants be planted? _____

19. Are you incorporating any stabilization structure(s) with this project? YES NO

If your answer is "YES", are these structures permanent or temporary? (Circle Choice)

Are these structures depicted on project drawings? YES NO

20. Will this restoration project involve encroachment channelward of mean low water? YES NO

If your answer is "YES", have you obtained the necessary authorizations for such encroachment? YES NO

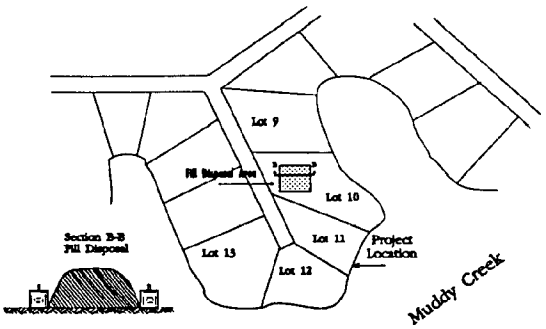
21. Will fertilizer be applied during planting? YES NO

If your answer is "YES", what brand of fertilizer will be applied and at what concentration?

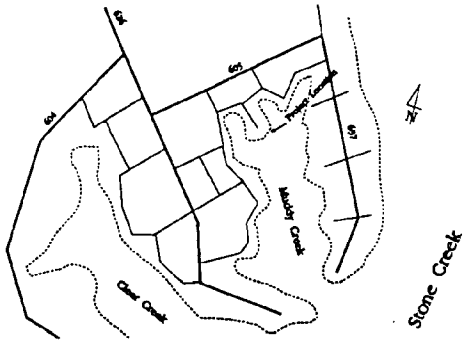
Brand _____ Concentration _____
(Include any follow-up fertilization in your maintenance schedule)

22. Indicate the length and individual components of your maintenance schedule following completion of construction. The minimum length is two years. (Include such items as, fertilization, wrack removal, replanting, and exotic species control, etc.)

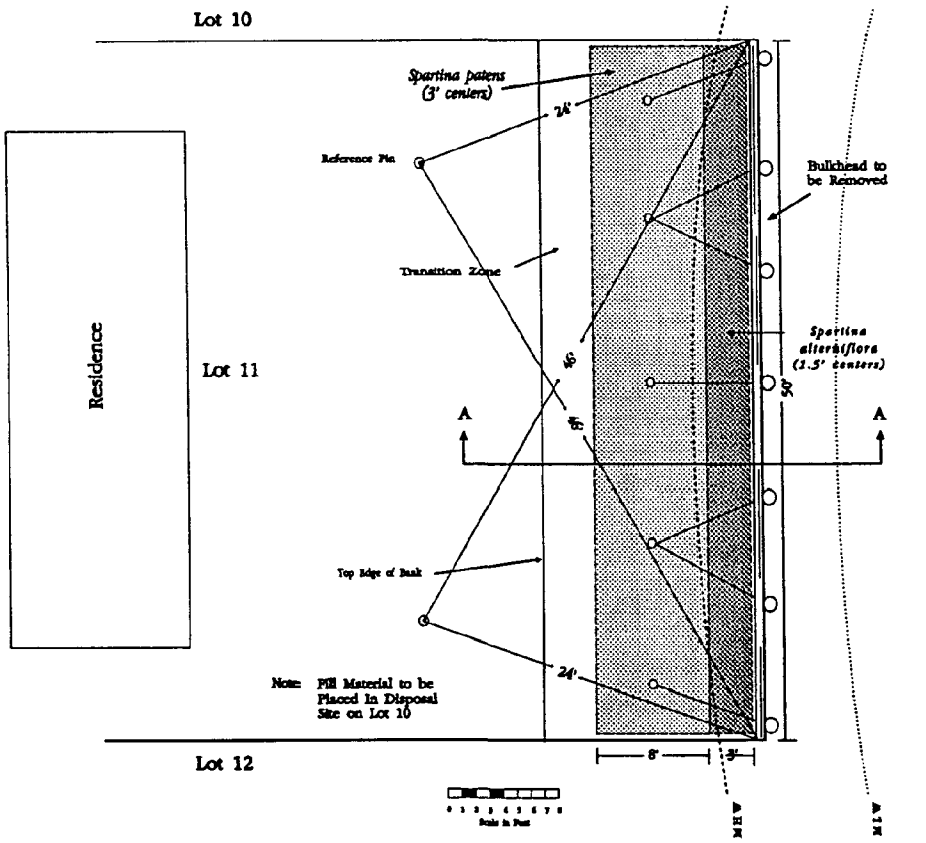
	Activity	Time of Year
Year 1		
	Activity	Time of Year
Year 2		



Site Map

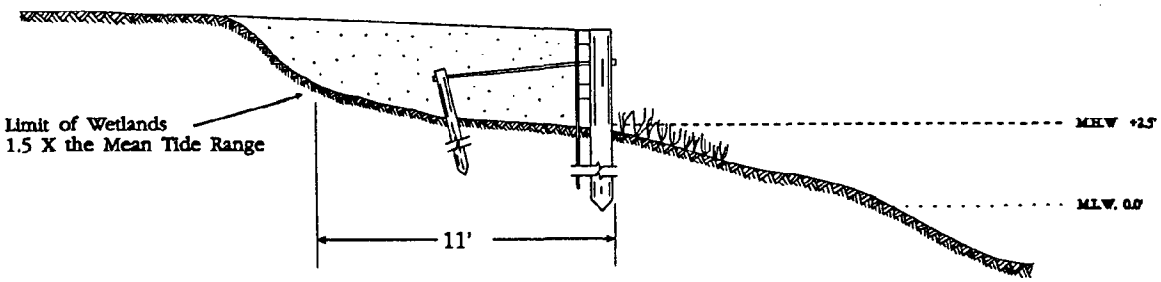


Vicinity Map

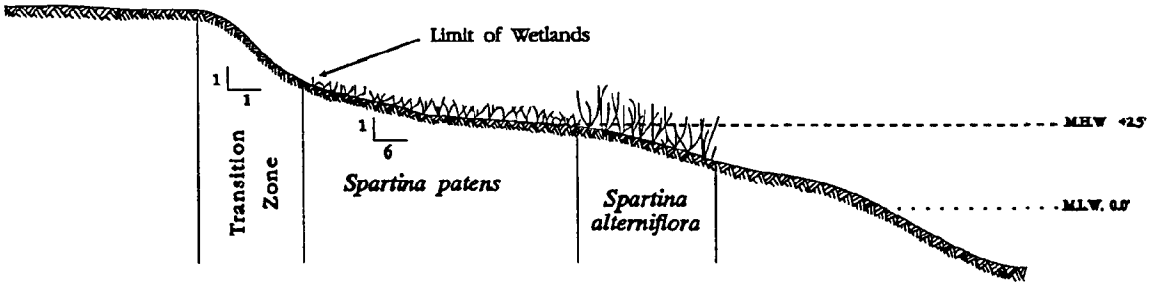


Datum: MLW Adjacent Property Owners 1. Lot 10, C.B. Parks 2. Lot 12, M.E. Lank	Plan View Proposed Restoration John G. Doe P.O. Box 123 Tidewater, Va 22222	County of: Northumberland Sheet 1 of 2 Date: August 3, 1991

Section A-A
Existing Fill and Bulkhead



Section A-A
Proposed Restoration



Datum: MLW Adjacent Property Owners 1. Lot 10, C.B. Parks 2. Lot 12, M.E. Lank	Cross Sections Proposed Restoration John G. Doe P.O. Box 123 Tidewater, Va 22222	County of: Northumberland Sheet 2 of 2 Date: August 3, 1991

Attachment B
Restoration Order

Pursuant to Section 62.1-13.16:1(C) of the Code of Virginia, having received a Sworn Complaint (Copy Attached), that a violation of Chapter 1, 2.1 or Chapter 2.2 of Title 62.1 of the Code exists, and having determined at a public hearing on _____ that restoration is necessary to recover lost resources and prevent further damage, you are hereby ordered to restore the area identified in accordance with specifications provided herein.

Site Location: _____
_____
_____

Scope of Restoration: _____
_____.

Restoration Monitoring Plan to be submitted by _____.
(Date)

This order requires the submission and approval of a Restoration Monitoring Plan acceptable to the _____(Wetlands Board or Commission) prior to physical restoration. Once approved, said plan will become a binding condition of this order. A bond or letter of credit payable to _____ in the amount of $_____, is required as well as a pre-paid contract to ensure the scientific monitoring is completed. Failure to complete the restoration so ordered in accordance with an approved Monitoring Plan shall constitute a separate violation of Chapters 1, 2.1 or 2.2 of the Code of Virginia. This Restoration Order shall remain in affect for the length of the approved Monitoring Plan.

Ordered by _____,
(Wetlands Board Chairman)
on _____, 19 __.

Notice served to _____,
(Signature of Person Notified)
on _____, 19 __.